

## 2. Maximum and Minimum Grades

a. The maximum grades in percent shall be:

| MAXIMUM VERTICAL GRADE (METRIC)   |                        |                            |         |             |
|---|------------------------|----------------------------|---------|-------------|
| Facility Type   | Design Speed<br>(km/h) | Maximum Grade<br>(Percent) |         |             |
|   |                        | Flat                       | Rolling | Mountainous |
| <b>RURAL</b>  |                        |                            |         |             |
| Minor Collector Roads*  | 30                     | 7                          | 10      | 12          |
|   | 50                     | 7                          | 9       | 10          |
|   | 65                     | 7                          | 8       | 10          |
|   | 80                     | 6                          | 7       | 9           |
|   | 100                    | 5                          | 6       | 8           |
|   | 110                    | 4                          | 5       | 6           |
| Local roads including Residential Collectors and Local Residential Streets* | 30                     | -                          | 11      | 16          |
|   | 50                     | 7                          | 10      | 14          |
|   | 65                     | 7                          | 9       | 12          |
|   | 80                     | 6                          | 8       | 10          |
|   | 100                    | 5                          | 6       | -           |
| <b>URBAN</b>  |                        |                            |         |             |
| Major Thoroughfares other than Freeway or Expressway                        | 50                     | 8                          | 9       | 11          |
|   | 65                     | 7                          | 8       | 10          |
|   | 80                     | 6                          | 7       | 9           |
|   | 100                    | 5                          | 6       | 8           |
| Minor Thoroughfares*  | 30                     | 9                          | 12      | 14          |
|   | 50                     | 9                          | 11      | 12          |
|   | 65                     | 9                          | 10      | 12          |
|   | 80                     | 7                          | 8       | 10          |
|   | 100                    | 6                          | 7       | 9           |
|   | 110                    | 5                          | 6       | 7           |
| Local Streets*  | 30                     | -                          | 11      | 16          |
|   | 50                     | 7                          | 10      | 14          |
|   | 65                     | 7                          | 9       | 12          |
|   | 80                     | 6                          | 8       | 10          |
|   | 100                    | 5                          | 6       | -           |

\* For streets and roads with projected annual average daily traffic less than 250 or short grades less than 150 meters (500 ft) long, grades may be 2% steeper than the values in the above table.

(Reference NCDOT Metric Design Manual page 1-12 T-3)